R E P O R T R E S U M E S

ED 014 155 EA 000 906

AN ANALYSIS OF ACHIEVEMENT BEHAVIOR IN THE LAW SCHOOL.
INDIANA STUDIES IN PREDICTION, NUMBER 9.
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PUB DATE AUG 67

EDRS PRICE MF-$0.25 HC-$1.48 35P.

DESCRIPTORS- *LAW SCHOOLS, *ACADEMIC ACHIEVEMENT, *GRADE POINT AVERAGE, *ADMISSION CRITERIA, UNDERGRADUATE STUDY, TABLES (DATA), STATISTICAL ANALYSIS, *PREDICTION, BLOOMINGTON,

THE VALIDITY OF THE TWO MOST COMMON PREDICTORS OF ACHIEVEMENT IN LAW SCHOOL, UNDERGRADUATE GRADE POINT AVERAGE (GPA) AND THE LAW SCHOOL ADMISSIONS TEST (LSAT) SCORE, WERE STUDIED. DATA WERE COLLECTED FOR THE 855 INDIANA UNIVERSITY LAW SCHOOL MATRICULANTS DURING EIGHT CONSECUTIVE YEARS FROM 1957 THROUGH 1964. SEPARATE REGRESSION ANALYSES WERE MADE FOR INDIANA UNIVERSITY UNDERGRADUATES AND FOR NON-INDIANA UNIVERSITY UNDERGRADUATES SINCE DIFFERENCES WERE APPARENT BETWEEN THE TWO GROUPS. THE MULTIPLE CORRELATIONS (GPA PLUS LSAT) WERE 0.59 FOR INDIANA UNIVERSITY UNDERGRADUATES AND 0.64 FOR NON-INDIANA UNIVERSITY UNDERGRADUATES. THESE WERE OF SUFFICIENT MAGNITUDE TO WARRANT THE DEVELOPMENT OF EXPECTANCY TABLES AND REGRESSION EQUATIONS FOR USE IN THE SELECTION AND ADVISEMENT OF STUDENTS. THERE WAS A 60-PERCENT VARIANCE IN THE CRITERION NOT ASSOCIATED WITH THESE PREDICTORS. THE RESIDUAL SCORE VARIANCE WAS STUDIED TO REDUCE THE NONPREDICTED CRITERION VARIANCE. THREE VARIABLES WERE USED IN STUDYING RESIDUAL SCORE VARIANCE--UNDERGRADUATE MAJOR AREA AND TWO CLASSIFICATIONS OF TYPES OF INSTITUTIONS. FOR INDIANA UNIVERSITY UNDERGRADUATES, DIFFERENCES BETWEEN OBTAINED LAW GPA AND PREDICTED GPA WERE FOUND TO BE SIGNIFICANTLY RELATED TO THE UNDERGRADUATE MAJOR AREA. SEPARATE EXPECTANCY TABLES AND REGRESSION EQUATIONS WERE DEVELOPED. (HW)

ED014155

INDIANA UNIVERSITY / 1967

An Analysis of Achievement Behavior in the Law School

INDIANA STUDIES IN PREDICTION

NUMBER NINE

MONOGRAPH OF THE
Bureau of Educational Studies and Testing

EA CCO 906

INDIANA STUDIES IN PREDICTION No. 9

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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AN ANALYSIS OF ACHIEVEMENT BEHAVIOR IN THE LAW SCHOOL

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Monograph of the

Bureau of Educational Studies
and Testing

Indiana University

August, 1967

PREFACE

This monograph, the ninth in a series, of the Bureau of Educational Studies and Testing is aimed at the purpose of more accurate prediction of academic achievement in the Law School at Indiana University. The previous eight monographs have likewise shared this basic objective of predicting academic success in some one of the university's collegiate units. These first eight monographs by title are:

No. 1 "Predicting Success for University Freshmen"

No. 2 "Predicting Individual Course Success for Entering Freshmen"

No. 3 "The Prediction and Analysis of Grade Achievement Behavior

No. 4 "Predicting Success for Advanced Graduate Students in Education"

No. 5 "Predicting Success for Master's Degree Students in Education"

No. 6 "The University Freshman Dropout"

No. 7 "Who Shall Persist?"

No. 8 "Tests of English Language as Predictors of Success for Foreign Students"

Many people have aided in the work of this rather extensive research effort. Chief among these persons have been Professors Douglass Boshkoff, William Golden and Harry Pratter of the Law School. Their initiation and support of the study has made this monograph possible.

Special thanks are due Mrs. Anne Bergmann for her central responsibility in processing the large volume of data.

R.C.P.

LIST OF TABLES

Table		Page
1.	Means and Standard Deviations of Undergraduate GPA, Law School Admission Test, and First Year Law School GPA for Indiana University Law School Students Classified by Entering Class	2
2.	Number and Per Cent of the 885 Students Distributed by Undergraduate Major for both Indiana University Undergraduates and Non-Indiana University Undergraduates	3
3.	Number and Per Cent of the 885 Students Distributed by Undergraduate Institution Classified by Highest Level of Training Offered	4
4.	Number and Per Cent of the 885 Students Distributed by Undergraduate Institution Classified by Type of Program Offered	5
5.	Relationship Between the Predictor Variables and the First Year Law School GPA for Indiana University and Non-Indiana University Undergraduates	6
6.	Variance in First Year Law School GPA Accounted for by each of the Predictors Based on Data for Indiana University Undergraduates and Non-Indiana University Undergraduates	8
7.	Means and Standard Deviations of Residual Scores for Non-Indiana University Undergraduates from Institutions Classified by Highest Level of Training Offered	9
8.	Means and Standard Deviations of Residual Scores for Non-Indiana University Undergraduates from Institutions Classified by Type of Program Offered	10
9.	Means and Standard Deviations of Residual Scores for Non-Indiana University Undergraduates Classified by Undergraduate Major Area	11
10.	Means and Standard Deviations of Residual Scores for Indiana University Undergraduates Classified by Collegiate Unit	12
11.	Relationship Between the Predictor Variables and the First Year Law School Grade Point Average for Indiana University School of Business and Indiana University College of Arts and Sciences Graduates	12

LIST OF TABLES (Cont'd)

Table		Page
12.	Variance in First Year Law School GPA Accounted for by Each of the Predictors Based on Data for Indiana University School of Business Undergraduates and Indiana University College of Arts and Sciences Undergraduates	14
13.	Scheme for Categorizing Undergraduate Majors into Areas for Indiana University Law School Students	19
14.	Expectancy Table Showing Frequency and Per Cent of Indiana University Undergraduates Passing, on Probation, and Failing at the end of the First Year of Law School distributed by their Undergraduate GPA and LSAT Score	22
15.	Expectancy Table Showing Frequency and Per Cent of Non-Indiana University Undergraduates Passing, on Probation, and Failing at the end of the First Year of Law School Given their UGPA and LSAT Scores	23
16.	Expectancy Table Showing Frequency and Per Cent of Indiana University School of Business Undergraduates who were Passing, on Probation, and Failing at the end of the First Year of Law School Given their UGPA and LSAT Scores	24
17.	Expectancy Table Showing Frequency and Per Cent of Indiana University College of Arts and Sciences Undergraduates who were Passing, on Probation, and Failing at the end of the First Year of Law School Given Their UGPA and LSAT Scores	25
18.	Regression Equations for Predicting First Year Law School GPA using UGPA and LSAT Scores	27
19.	Analysis of Variance of Undergraduate Grade Point Average for Indiana University Law School Students Classified by Entering Class	28
20.	Analysis of Variance of Law School Admission Test Scores for Indiana University Law School Students Classified by Entering Class	28
21.	Analysis of Variance of First Year Law School Grade Point Average for Indiana University Law School Students Classified by Entering Class	29

LIST OF TABLES (Cont'd)

Table		Page
22.	Analysis of Variance of Residual Scores for Non-Indiana University Undergraduates from Institutions Classified by Highest Level of Training	29
23.	Analysis of Variance of Residual Scores for Non-Indiana University Undergraduates from Institutions Classified by Type of Program Offered	30
24.	Analysis of Variance of Residual Scores for Non-Indiana University Undergraduates Classified by Undergraduate Major	30
25.	Analysis of Variance of Residual Scores for Indiana University Undergraduates Classified by Collegiate Unit	31

INDIANA STUDIES IN PREDICTION: No. 9

PREDICTING SUCCESS FOR FIRST YEAR LAW SCHOOL STUDENTS IN INDIANA UNIVERSITY

Introduction to the Problem

During the academic year 1965-66, the Bureau of Educational Studies and Testing was requested by the Law School at Indiana University to carry out a criterion-related validity study of the usual predictors of success in the Law School--undergraduate grade point average and the Law School Admissions Test. Historically, the Bureau had completed a similar study in 1961 for the Law School. At that time, the Law School enrollment was not of a critical magnitude; therefore, the use of the 1961 validity study was primarily for advising students of their probable success and not necessarily useful in selecting a significant mass. By the academic year 1965-66, the enrollment in the Law School had increased to a critical magnitude where a large number of applicants could obviously not be served because of the space limitations and other restricting resources of the Law School and accentuated the need for selecting students with the most probable success. This monograph, number nine in a series of the Indiana Studies in Prediction, treats the problem faced by the Law School in the selection of students whose probability of success will be the highest.

The criterion of success in the Law School is defined in this study as the grade point average accumulated by students in the first year of Law School study.[1] There were two primary predictor variables used in this study. One of these predictor variables was the undergraduate grade point average accumulated by the Law School students during the four years of their undergraduate study.[2] Undergraduate schools were grouped homogeneously by types and classifications of institutions in order to study the error in the undergraduate GPA attributable to differences among institutions. The types and classifications of institutions defined in the Part 3 Directory of Higher Education were used.[3] The undergraduate major area of study for each of the students was also defined and investigated as it related to success in Law School.

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[1]A weighting system was used in which an "A" was given a value of 4, "B" a value of 3, "C" a value of 2, "D" a value of 1, and "F" a value of 0.

[2]All undergraduate transcripts were converted to a weighting scheme in which an A was given a weight equal to 4, B = 3, C = 2, D = 1, and F = 0.

[3]Education Directory, Part 3, Higher Education, 1965-66, U. S. Government Printing Office, Washington, D. C.

The second primary predictor variable was the Law School Admission Test (LSAT), an instrument developed and published by Educational Testing Service.[4] This test is intended to provide a measure of certain aptitudes which have been found to be important in the study of law. The primary purpose of this study was then to determine the ability of the undergraduate grade point average (UGPA) and the LSAT in predicting achievement during the first year of Law School study.

Plan of the Study

Undergraduate grade point averages, LSAT scores, undergraduate major area, undergraduate institution, and the first year grade point average in Law School were collected for students during eight consecutive years, beginning with the entering Law School class of 1957 and terminating with the entering Law School class of 1964. This sample included a total of 885 students who persisted for at least one academic year.

The number of students in each class during the eight years is reported in Table 1 along with means and standard deviations of the LSAT, undergraduate grade point average and the first year Law School GPA.

TABLE 1. MEANS AND STANDARD DEVIATIONS OF UNDERGRADUATE GPA, LAW SCHOOL ADMISSION TEST, AND FIRST YEAR LAW SCHOOL GPA FOR INDIANA UNIVERSITY LAW SCHOOL STUDENTS CLASSIFIED BY ENTERING CLASS

Entering Class	N	Undergraduate GPA		LSAT		First Year Law GPA	
		M	SD	M	SD	M	SD
1957	82	2.78	0.45	465	98	2.04	0.64
1958	95	2.74	0.52	480	101	1.82	0.71
1959	85	2.69	0.44	488	93	1.87	0.63
1960	90	2.67	0.45	497	86	1.98	0.63
1961	68	2.76	0.49	509	88	2.02	0.69
1962	128	2.61	0.43	487	99	1.89	0.65
1963	148	2.60	0.43	506	82	2.08	0.60
1964	189	2.60	0.43	508	85	2.01	0.65
1957 through 1964 combined	885	2.66	0.45	495	91	1.97	0.65

[4] Law School Admission Test, Bulletin Of Information for Candidates, 1966-67, Educational Testing Service, Princeton, New Jersey.

The stability of the three variables across the eight years was investigated by a single classification analysis of variance. The results of these tests showed statistically significant differences among the eight classes on each of the three variables. (Tables 19, 20 and 21 of the Appendix) However, when an omega square (ω^2) power test was employed, no more than 1.5 per cent of the variance in each of these three variables could be associated with the differences among the eight classes. Therefore, the decision was made to combine the data on the eight classes for the study.

The undergraduate major area was identified for each of the Law School students, and a distribution of the number and per cent within each major area is presented in Table 2. Data for Indiana University and non-Indiana University students are presented separately.[5]

TABLE 2. NUMBER AND PER CENT OF THE 885 STUDENTS DISTRIBUTED BY UNDERGRADUATE MAJOR FOR BOTH INDIANA UNIVERSITY UNDERGRADUATES AND NON-INDIANA UNIVERSITY UNDERGRADUATES.

Undergraduate Major Area	I. U.		Non-I. U.		Total	
	N	Per cent	N	Per cent	N	Per cent
Social Science	139	30.2	177	41.7	316	35.7
Humanities	57	12.3	112	26.5	169	19.1
Physical Science	13	2.8	11	2.6	24	2.7
Biological Science	7	1.5	24	5.7	31	3.5
Business	239	51.7	70	16.5	309	34.9
Engineering	0	0.0	27	6.3	27	3.1
Police Administration	7	1.5	0	0.0	7	0.8
Not Classified	0	0.0	2	0.7	2	0.2
TOTAL	462	100.0	423	100.0	885	100.0

[5]For further information on the grouping of majors into areas see Table 13 presented in the Appendix.

For the total sample of 885 students, the undergraduate major areas of social sciences, business, and humanities represent approximately 90 per cent of the group. When the undergraduate major area is cross-tabulated with undergraduate institution (I.U. and non-I.U.), we see the same three major areas contributing most of the students to the Law School. However, slightly over one-half of the I.U. undergraduates (51.7 per cent) did their undergraduate work in business compared to only 16.5 per cent of the non-I.U. undergraduates. Among other differences, a larger per cent majored in the social sciences and the humanities in the non-I.U. group (68.2 per cent) than in the I.U. group (42.5 per cent).

The institutions from which the Law School students received their undergraduate degrees were classified according to highest level of training offered and type of program. Table 3 shows the number and per cent of students distributed by highest level of training offered by their undergraduate institution.

TABLE 3. NUMBER AND PER CENT OF THE 885 STUDENTS DISTRIBUTED BY UNDERGRADUATE INSTITUTION CLASSIFIED BY HIGHEST LEVEL OF TRAINING OFFERED

Institution Classification	N	Per cent
Indiana University	462	52.2
Non-Indiana University		
Only bachelors or first professional degrees	110	12.4
Masters or second professional degrees	126	14.3
Doctor of Philosophy or equivalent	187	21.1
TOTAL	885	100.0

As can be seen in Table 3 approximately one-half (52.2 per cent) were graduated from Indiana University. Among the non-I.U. graduates, 21.1 per cent were graduated from institutions which offered a Doctor of Philosophy or equivalent degree as the highest level of training, 14.3 per cent were graduated from institutions which offered a Master's or second professional degree as the highest level of training, and 12.4 per cent were graduated from institutions which offered only the Bachelor's or first professional degree.

The number and per cent of the students are distributed in Table 4 by undergraduate institution classified by type of program offered.

TABLE 4. NUMBER AND PER CENT OF THE 885 STUDENTS DISTRIBUTED BY UNDERGRADUATE INSTITUTION CLASSIFIED BY TYPE OF PROGRAM OFFERED

Institution Classification	N	Per cent
Indiana University	462	52.2
Purdue University	66	7.5
Non-Indiana University (excluding Purdue University)		
1. Liberal arts and general	35	4.0
2. Liberal arts and general and teacher preparatory	71	8.0
3. Liberal arts and general, teacher preparatory, and terminal occupation	19	2.1
4. Professional only (not including teacher preparatory)	17	1.9
5. Liberal arts and general with one or two professional schools	56	6.3
6. Liberal arts and general with three or more professional schools	159	18.0
TOTAL	885	100.0

In this classification, the number of graduates from Purdue University (66 or 7.5 per cent of the sample) was considered of sufficient magnitude to identify them separately from all other non-I.U. graduates. Further review of Table 4 reveals that 18 per cent of the students were graduated from institutions which offered degrees in liberal arts and general curricula plus three or more professional degree programs.

In summary, the sample can be described as being composed of approximately one-half Indiana University undergraduates and one-half non-I.U. undergraduates. The majority of the I.U. undergraduates had majors in business whereas the majority of the non-I.U.

undergraduates had majors in either the social sciences or the humanities. Of the non-I.U. group more came from multipurpose universities offering the doctorate than from any other kind of institution.

Results

Multiple linear regression equations were generated in a stepwise manner to predict first year Law School GPA from a weighted combination of the undergraduate GPA and the LSAT. At each of the two steps (two predictor variables), a predictor variable was added to the regression equation. The predictor variable initially selected was the one which made the greatest reduction in the residual sum of squares. Since the I.U. undergraduates and non-I.U. undergraduates represented somewhat different emphases in undergraduate programs, the predictions were made for each group independently.

The zero-order correlation coefficient for each predictor variable and the multiple correlation for the two predictors of the first year Law School GPA are presented for each group in Table 5. Expectancy tables are presented in Tables 14 and 15 of the Appendix and the equations for predicting the criterion are given in Table 18 of the Appendix.

TABLE 5. RELATIONSHIP BETWEEN THE PREDICTOR VARIABLES AND THE FIRST YEAR LAW SCHOOL GPA FOR INDIANA UNIVERSITY AND NON-INDIANA UNIVERSITY UNDERGRADUATES.

Predictor variables	Indiana University undergraduates (N = 462) Correlation	Non-Indiana University undergraduates (N = 423) Correlation
1. Undergraduate GPA	0.55	0.44
2. Law School Admission Test	0.40	0.57
Multiple Correlation (1 & 2)	0.59	0.64

For the I.U. undergraduates, the undergraduate GPA correlated 0.55 with the first year Law School GPA, and the LSAT correlated 0.40 with the Law GPA. The multiple correlation from the combination of the two predictors was 0.59 for the I. U. group. The standard error of estimate for the first year Law School GPA was 0.52 of a grade point i.e., 68 per cent actually will attain GPA's within plus or

minus 0.52 of their predicted GPA. For the non-I.U. group, the highest zero-order predictor was the LSAT which correlated 0.57 with the criterion. By combining the undergraduate GPA with the LSAT, the correlation increased to 0.64 with first year Law School GPA. The error of estimate of the criterion was 0.50 of a grade point.

When variables are combined in the multiple prediction of a criterion, it is often revealing to determine the independent contribution of each predictor to the total correlation so that the decision of obtaining both predictor measures is evaluated. It was necessary to compute the independent contribution a variable made to the prediction of variance in the criterion as well as the variance in the criterion each variable shared with others in the combination used to make the prediction. The results of these analyses are presented in Table 6.

The relative values of the undergraduate GPA and LSAT in predicting first year Law School GPA obviously differ for I.U. undergraduates and non-I.U. undergraduates. For I.U. undergraduates, the undergraduate GPA is independently associated with the greater amount of variance in the criterion, approximately 22.10 per cent, whereas, the LSAT is independently associated with the criterion 5.22 per cent. This is to say that 22.10 per cent of whatever it is that makes people different from each other in Law GPA also is associated with differences on the undergraduate GPA and that 5.22 per cent of Law GPA differences are associated with differences on the LSAT. Conversely, the LSAT score carries more weight than undergraduate GPA in predicting grade point averages for non-I.U. undergraduates--23.63 per cent compared to 9.91 per cent.

The total variance in the criterion associated with both predictors is found by adding the total variance associated with the predictor variables. This leaves about three-fifths of the variance in GPA <u>not</u> predicted for both groups. More of the characteristics that make people different in first year Law School achievement are <u>not</u> represented in these two predictor variables than are represented. Therefore, some error in prediction will occur.

A Look at the Residuals

An additional step in reducing the non-predicted Law GPA variance was taken in a study of the residual scores. These residual scores were computed by subtracting the Law GPA predicted by a weighted combination of LSAT and UGPA from the actual Law GPA obtained by the students.

Frequently, the non-predicted criterion variance i.e., differences among students as measured by Law GPA, can be reduced by selecting variables which show a significant relationship with the residual scores. Three such variables were selected, namely: undergraduate institutions classified by highest level of training offered, undergraduate institutions classified by type of program

TABLE 6. PER CENT OF VARIANCE IN FIRST YEAR LAW SCHOOL GPA ACCOUNTED FOR BY EACH OF THE PREDICTORS BASED ON DATA FOR INDIANA UNIVERSITY UNDERGRADUATES AND NON-INDIANA UNIVERSITY UNDERGRADUATES

Predictor	Independent association with variance in criterion	Variance in criterion shared with other predictors	Total variance in criterion associated with this variable	Variance in criterion not accounted for
Indiana University Undergraduate (N = 462)				
Undergraduate GPA	22.10	3.80	25.90	
LSAT	5.22	3.80	9.02	65.08
Non-Indiana University Undergraduates (N = 423)				
Undergraduate GPA	9.91	3.88	13.79	
LSAT	23.63	3.88	27.51	58.70

offered, and undergraduate major area. It was thought that these three variables might eliminate some of the apparent inequalities which frequently exist in undergraduate achievement as measured by an undergraduate GPA.

First, the undergraduate institutions were classified by highest level of training offered. The means and standard deviations of the residual scores for three levels of classification are presented in Table 7.

TABLE 7. MEANS AND STANDARD DEVIATIONS OF RESIDUAL SCORES FOR NON-INDIANA UNIVERSITY UNDERGRADUATES FROM INSTITUTIONS CLASSIFIED BY HIGHEST LEVEL OF TRAINING OFFERED

Institution classification	Group size	Residual score	
		Mean	Standard Deviation
Bachelors degrees or first professional degrees	110	0.0005	0.5124
Masters or second professional degrees	126	-0.0624	0.4791
Doctor of Philosophy or equivalent	187	0.0435	0.5113

Since a residual score has been defined as the actual Law GPA minus the predicted Law GPA, a positive residual score says that the student actually achieved a higher GPA than he was predicted to, and a negative residual score says he made a lower GPA than predicted. For example, the mean residual score of 0.0005 for the 110 students who were graduated from undergraduate institutions which offered only a Bachelor's or first professional degree means that, on the average, students like these will be under-predicted by an amount equal to 0.0005 of a GPA unit by using the Non-Indiana University undergraduate equation found in Table 18 of the Appendix. Similarly, one can interpret the other mean residual scores. The mean residual score of -0.0624 for the 126 students who were graduated from Master's or second professional degrees institutions represents an average over-prediction of 0.0624 GPA units. The third group, those who were graduated from institutions which offered a Doctor of Philosophy or equivalent degree, were underpredicted, on the average, 0.0435 GPA units.

These mean residual scores were used as illustrations to convey meaning to the residual score measure, not to accentuate differences among the three groups. The differences in residuals

among the three groups were tested by an analysis of variance and no significant differences were found (See Table 22 in the Appendix).

The second variable selected for study to reduce the non-predicted variance in Law GPA was undergraduate institution classified by type of program offered. One can see from the distribution of students presented in Table 4 that some of the categories or levels of classification include very few students. Therefore, categories were combined in order to increase the size of the groups. As can be seen in Table 8. two classifications resulted from the collapse of categories--the primary difference being those which do not include at least one professional school in their program in contrast to those which do have at least one professional school.

TABLE 8. MEANS AND STANDARD DEVIATIONS OF RESIDUAL SCORES FOR NON-INDIANA UNIVERSITY UNDERGRADUATES FROM INSTITUTIONS CLASSIFIED BY TYPE OF PROGRAM OFFERED

Institution classification	Group size	Residual score	
		Mean	Standard Deviation
1 Liberal Arts and general			
2 Liberal Arts and general, and teacher preparatory			
3 Liberal Arts and general, teacher preparatory, and terminal occupational	125	-0.013	0.488
5 Liberal Arts and general with one or two professional schools			
6 Liberal Arts and general with three or more professional schools	215	0.025	0.512

On the average, the 125 graduates from institutions not offering at least one professional school program tend to be over-predicted 0.013 GPA units i.e., they do not achieve a Law GPA as high as they are predicted to achieve. For the 215 graduates from institutions which offered at least one professional school program, the average residual score was 0.025, an average under-prediction of 0.025 GPA units. However, an analysis of residual score variance showed no significant difference between the two groups (See Table 23 in the Appendix).

The third attempt to reduce the non-predicted variance in Law GPA involved the use of the student's undergraduate major. Both Indiana University and non-Indiana University undergraduates were studied; however, they were grouped separately.

The means and standard deviations of the residual scores for the three largest groups of non-Indiana University undergraduates are shown in Table 9.

TABLE 9. MEANS AND STANDARD DEVIATIONS OF RESIDUAL SCORES FOR NON-INDIANA UNIVERSITY UNDERGRADUATES CLASSIFIED BY UNDERGRADUATE MAJOR AREA

Major area	Group size	Residual score Mean	Residual score Standard Deviation
Social Science	177	-0.040	0.466
Humanities	112	0.030	0.540
Business	70	0.099	0.527

As was found in the previous two analyses of residual score variance, no significant difference was found among these three major area groups. (See Table 24 in the Appendix). The conclusion is reached that no reduction in non-predicted criterion variance can be made for non-Indiana University undergraduates with the use of the three variables selected for inclusion in this study.

The last attempt in this study to reduce non-predicted criterion variance was made by identifying the undergraduate major area of Indiana University undergraduates. The decision was made to categorize the Indiana University undergraduates into two groups--School of Business graduates and College of Arts and Sciences graduates. In reference to Table 2, the College of Arts and Sciences group includes the undergraduate major areas of social science, humanities, physical science, biological science, and police administration. The residual score means and standard deviations are shown in Table 10.

TABLE 10. MEANS AND STANDARD DEVIATIONS OF RESIDUAL SCORES FOR INDIANA UNIVERSITY UNDERGRADUATES CLASSIFIED BY COLLEGIATE UNIT

Collegiate unit	Group size	Residual score	
		Mean	Standard Deviation
School of Business	239	0.0675	0.4872
College of Arts and Sciences	223	-0.0710	0.5455

The residual scores of the Indiana University School of Business graduates were found to differ significantly from the residual scores of the Indiana University College of Arts and Sciences graduates. (See Table 25 in the Appendix). The School of Business graduates were under-predicted, on the average, 0.0675 GPA units, whereas the average residual score of the College of Arts and Sciences graduates was an over-prediction of 0.0710 GPA units.

This difference between the two Indiana University undergraduate groups was statistically significant; therefore, prediction equations were developed for each group (See Table 18 in the Appendix). The relationships of the predictor variables with the criterion, separately and in combination, are given in Table 11. Expectancy tables have been developed for the two groups and are presented in Tables 16 and 17 of the Appendix.

TABLE 11. RELATIONSHIP BETWEEN THE PREDICTOR VARIABLES AND THE FIRST YEAR LAW SCHOOL GRADE POINT AVERAGE FOR INDIANA UNIVERSITY SCHOOL OF BUSINESS AND INDIANA UNIVERSITY COLLEGE OF ARTS AND SCIENCES GRADUATES

Predictor Variables	School of Business (N = 239) Correlation	College of Arts & Sciences (N = 223) Correlation
1. Undergraduate GPA	0.50	0.61
2. Law School Admission Test	0.44	0.36
Multiple Correlation (1 & 2)	0.58	0.63

The multiple correlation of the undergraduate GPA and LSAT was 0.58 for the Indiana University School of Business graduates and 0.63 for the Indiana University College of Arts and Sciences graduates. The regression equations and standard errors of estimate based on these relationships are presented in Table 18 of the Appendix. The results of computing the independent variance contributed by each predictor variable and the total variance in the criterion contributed by each variable are reported in Table 12.

The overall gain in prediction of criterion variance by grouping separately the School of Business graduates and the College of Arts and Science graduates as opposed to keeping the students in one group is small. The sum of squares for residuals has been reduced slightly from 125.14 to 121.27 by separating the two undergraduate groups. Correspondingly, the sum of squares for regression has increased from 67.18 to 70.29. The multiple correlation coefficients have changed slightly from 0.59 for the combined group to 0.58 for the School of Business graduates and 0.63 for the College of Arts and Sciences graduates. The independent criterion variance contributed by the undergraduate GPA was 15.42 per cent for the School of Business graduates compared to 30.61 per cent for the College of Arts and Sciences graduates. The LSAT contributed independently 9.82 per cent of the criterion variance for the School of Business graduates in contrast to 2.41 per cent for the College of Arts and Sciences graduates. The relative contribution to the prediction of the variance in Law GPA for the two variables clearly shifts for the two groups. For the College of Arts and Sciences graduates, the utility of the LSAT is very low and one might recommend that the LSAT be dropped without an appreciable loss in accuracy. However, the choice of using two distinct and separate regression equations for the two groups or one equation for the combined group should be based as much on the logistics of the processing of scores as on the statistical findings.

TABLE 12. PER CENT OF VARIANCE IN FIRST YEAR LAW SCHOOL GPA ACCOUNTED FOR BY EACH OF THE PREDICTORS BASED ON DATA FOR INDIANA UNIVERSITY SCHOOL OF BUSINESS UNDERGRADUATES AND INDIANA UNIVERSITY COLLEGE OF ARTS AND SCIENCES UNDERGRADUATES

Predictor	Independent association with variance in criterion	Variance criterion shared with other predictors	Total variance in criterion associated with this variable	Variance in criterion not accounted for
School of Business Undergraduates (N = 239)				
Undergraduate GPA	15.42	4.02	19.44	
LSAT	9.82	4.02	13.84	66.70
College of Arts and Sciences Undergraduates (N = 223)				
Undergraduate GPA	30.61	3.19	33.80	
LSAT	2.41	3.19	5.60	60.60

Summary

The Bureau of Educational Studies and Testing was requested by the Law School at Indiana University to study the criterion-related validity of the two most common predictors of achievement in Law School--undergraduate grade point average and the Law School Admissions Test. Data were collected for Indiana University Law School matriculants during eight consecutive years beginning with the entering class of 1957 and terminating with the entering Class of 1964. Separate regression analyses were made for Indiana University undergraduates and for non-Indiana University undergraduates since differences were apparent between the two groups in regard to relative emphases within undergraduate major areas.

The multiple correlations (UGPA plus LSAT) were 0.59 for Indiana University undergraduates and 0.64 for non-Indiana University undergraduates. These relationships were considered of sufficient magnitude that expectancy tables and regression equations were developed for use in the selection and advisement of students.

Even though the correlations were as high as one might expect, the per cent of variance in the criterion not associated with these predictors was approximately 60 (65 for Indiana University graduates and 59 for non-Indiana University graduates). Therefore, a study was made of the residual score variance in an attempt to reduce the non-predicted criterion variance.

Residual score variance was studied by using the variables undergraduate major area and two classifications of types of institutions. Differences between obtained Law GPA and predicted GPA were found to be significantly related to one variable--undergraduate major area for Indiana University undergraduates. Indiana University School of Business graduates were found to be under-predicted and Indiana University College of Arts and Sciences graduates were found to be over-predicted. Separate expectancy tables and regression equations were developed. A slight reduction in residual score variance resulted, but there remained no clear choice between treating Indiana University undergraduates as one group or separating them into two groups.

APPENDIX

The information presented here is designed to facilitate the application of the results of the foregoing validity study and are prepared for use in making decisions about Law School students at Indiana University.

In Table 13 a scheme for categorizing undergraduate majors into areas is given. This scheme could be followed in future prediction studies especially since the undergraduate major area was revealed to be a relevant variable to study.

TABLE 13. SCHEME FOR CATEGORIZING UNDERGRADUATE MAJORS INTO AREAS FOR INDIANA UNIVERSITY LAW SCHOOL STUDENTS

Code	Major area category	Undergraduate major
1	Social Sciences	Anthropology
		Economics
		Education
		Government
		Military Science
		Physical Education
		Political Science
		Radio - Film - TV
		Social Service
		Social Studies
		Sociology
2	Humanities	Classical Language
		English
		English Law
		English Literature
		Foreign Languages
		History
		Journalism
		Liberal Arts
		Philosophy
		Pre Law
		Speech
3	Physical Sciences	Chemistry
		Geography
		Geology
		Mathematics
		Pharmacy
		Physics

TABLE 13 (CONTINUED)

Code	Major area category	Undergraduate major
4	Biological Sciences	Agriculture Anatomy Biology Botany Microbiology Pre Medicine Psychology Zoology
5	Business	Accounting Business Administration Business Education Business Law Commerce Finance General Business International Affairs Management Marketing
6	Engineering	Chemical Engineering Civil Engineering Electrical Engineering Mechanical Engineering Industrial Engineering
7	Police Administration	Police Administration

To facilitate the study of a student's undergraduate GPA and LSAT score in estimating his first year Law School GPA, expectancy tables have been developed.

Table 14 shows the frequency and per cent of Indiana University undergraduate students who are likely to be passing, on probation, and failing at the end of the first year of Law School given their undergraduate GPA and LSAT scores. To use the per cent section of Table 14, determine a student's undergraduate GPA and LSAT score. Find the appropriate LSAT score column and undergraduate GPA row. At the intersection of the column and row will be three numbers. The first or top number gives the per cent of students with similar LSAT scores and undergraduate GPA's who will be passing at the end of the first year of Law School. The second or middle number gives the per cent of students with a similar undergraduate GPA and LSAT score who will be on probation at the end of the first year of Law School. The third or bottom number gives the per cent of similar students who will be failing at the end of the first year of Law School. The frequency section of Table 14 merely shows the sample size upon which these per cents are based.

Table 15 provides similar information for non-Indiana University undergraduates. For example, suppose Mr. Smith has been graduated from Peace University with an undergraduate GPA of 2.80 and obtained an LSAT score of 420. Upon entering Table 15, we see that 50 per cent of the students like Mr. Smith will be passing at the end of the first year of Law School, 12 per cent will be on probation, and 38 per cent will be failing.

Table 16 shows similar information for Indiana University School of Business undergraduates. This Table could be used for School of Business graduates in lieu of Table 14.

Table 17 gives information for Indiana University College of Arts and Sciences undergraduates and could be used for Arts and Sciences graduates in lieu of Table 14.

TABLE 14. EXPECTANCY TABLE SHOWING FREQUENCY AND PER CENT OF INDIANA UNIVERSITY UNDERGRADUATES PASSING, ON PROBATION, AND FAILING AT THE END OF THE FIRST YEAR OF LAW SCHOOL DISTRIBUTED BY THEIR UNDERGRADUATE GPA AND LSAT SCORE

Undergraduate GPA		LSAT score 449 and below	LSAT score 450-549	LSAT score 550 and above	UGPA frequency totals	LSAT score 449 and below	LSAT score 450-549	LSAT score 550 and above	UGPA per cent totals
		Frequency				Per cent			
3.01 and above	1*	9	35	61	105	100	95	100	98
	2	0	2	0	2	0	5	0	2
	3	0	0	0	0	0	0	0	0
2.51-3.00	1	42	68	39	149	70	83	86	80
	2	5	6	3	14	8	7	7	7
	3	13	8	3	24	22	10	7	13
2.50 and below	1	26	49	21	96	42	66	66	57
	2	15	10	3	28	24	14	9	17
	3	21	15	8	44	34	20	25	26
LSAT score totals	1	77	152	121	350	59	79	88	76
	2	20	18	6	44	15	9	4	10
	3	34	23	11	68	26	12	8	14

*1 Passing (GPA $\geq$ 1.60)
2 Probation (1.39 < GPA < 1.60)
3 Failing (GPA $\leq$ 1.39)

TABLE 15. EXPECTANCY TABLE SHOWING FREQUENCY AND PER CENT OF NON-INDIANA UNIVERSITY UNDERGRADUATES PASSING, ON PROBATION, AND FAILING AT THE END OF THE FIRST YEAR OF LAW SCHOOL GIVEN THEIR UGPA AND LSAT SCORES

Undergraduate GPA		LSAT score 449 and below	LSAT score 450-549	LSAT score 550 and above	UGPA frequency totals	LSAT score 449 and below	LSAT score 450-549	LSAT score 550 and above	UGPA per cent totals
		Frequency				Per cent			
3.01 and above	1*	13	31	39	83	72	91	100	92
	2	2	2	0	4	11	6	0	4
	3	3	1	0	4	17	3	0	4
2.51-3.00	1	21	44	34	99	50	79	97	74
	2	5	3	0	8	12	5	0	6
	3	16	9	1	26	38	16	3	20
2.50 and below	1	37	53	32	122	42	71	86	61
	2	12	7	4	23	14	9	11	12
	3	38	15	1	54	44	20	3	27
LSAT score totals	1	71	128	105	304	48	78	95	72
	2	19	12	4	35	13	7	3	8
	3	57	25	2	84	39	15	2	20

*1 Passing (GPA $\geq$ 1.60)
2 Probation (1.39 $<$ GPA $<$ 1.60)
3 Failing (GPA $\leq$ 1.39)

TABLE 16. EXPECTANCY TABLE SHOWING FREQUENCY AND PER CENT OF INDIANA UNIVERSITY SCHOOL OF BUSINESS UNDERGRADUATES WHO WERE PASSING, ON PROBATION, AND FAILING AT THE END OF THE FIRST YEAR OF LAW SCHOOL GIVEN THEIR UGPA AND LSAT SCORES

Undergraduate GPA		LSAT score 449 and below	450-549	550 and above	UGPA frequency totals	LSAT score 449 and below	450-549	550 and above	UGPA per cent totals
		Frequency				Per cent			
3.01 and above	1*	5	13	27	45	100	93	100	98
	2	0	1	0	1	0	7	0	2
	3	0	0	0	0	0	0	0	0
2.51-3.00	1	23	31	20	74	68	78	91	78
	2	5	4	2	11	15	10	9	11
	3	6	5	0	11	17	12	0	11
2.50 and below	1	16	32	13	61	34	74	76	64
	2	10	6	2	18	22	14	12	18
	3	11	5	2	18	24	12	12	18
LSAT score totals	1	44	76	60	180	58	79	91	75
	2	15	11	4	30	20	11	6	13
	3	17	10	2	29	22	10	3	12

*1 Passing (GPA $\geq$ 1.60)
2 Probation (1.39 $<$ GPA $<$ 1.60)
3 Failing (GPA $\leq$ 1.39)

TABLE 17. EXPECTANCY TABLE SHOWING FREQUENCY AND PER CENT OF INDIANA UNIVERSITY COLLEGE OF ARTS AND SCIENCE UNDERGRADUATES WHO WERE PASSING, ON PROBATION, AND FAILING AT THE END OF THE FIRST YEAR OF LAW SCHOOL GIVEN THEIR UGPA AND LSAT SCORES

Undergraduate GPA		LSAT score 449 and below	450-549	550 and above	UGPA frequency totals	LSAT score 449 and below	450-549	550 and above	UGPA per cent totals
		Frequency				Per cent			
3.01 and above	1*	4	22	33	59	100	96	97	96
	2	0	1	0	1	0	4	0	2
	3	0	0	1	1	0	0	3	2
2.51-3.00	1	10	53	21	84	59	92	84	84
	2	0	2	1	3	0	3	4	3
	3	7	3	3	13	41	5	12	13
2.50 and below	1	10	11	5	26	38	44	45	42
	2	5	4	1	10	19	16	10	16
	3	11	10	5	26	43	40	45	42
LSAT score totals	1	24	86	59	169	51	81	84	76
	2	5	7	2	14	11	7	3	6
	3	18	13	9	40	38	12	13	18

*1 Passing (GPA $\geq$ 1.60)
2 Probation (1.39 < GPA < 1.60)
3 Failing (GPA $\leq$ 1.39)

In Table 18 regression equations for predicting first year Law School GPA are given for using the undergraduate GPA and LSAT score. To predict a GPA, scores of a student are multiplied by the weighted coefficients and these products are added to a constant in order to determine a predicted GPA. For example, let us take Mr. Smith. Suppose he is a graduate of Peace University with an undergraduate GPA of 2.80 and an obtained LSAT score of 420. Since he was graduated from Peace University, the appropriate equation is the second, labeled non-Indiana University undergraduates. His predicted GPA would equal 0.43978(2.80) + 0.00333(420) - 0.84106. This computation equals a predicted GPA of 1.79. This predicted GPA is the expected average GPA for all students who have the same scores as Mr. Smith. Actual GPA's will vary slightly above and below this predicted value. Approximately two-thirds of the students with this predicted GPA will have actual GPA's between plus and minus one standard error of estimate. Thus, for students who have been predicted to have a GPA of 1.79, two-thirds of them will actually achieve between 1.29 and 2.29, or 1.79 plus and minus one standard error of 0.50 of a GPA.

TABLE 18. REGRESSION EQUATIONS FOR PREDICTING FIRST YEAR LAW SCHOOL GPA USING UGPA AND LSAT SCORES

Equation	Standard error of estimate
1. Indiana University undergraduates (N=462)	
0.70443(UGPA) + 0.00170(LSAT) - 0.74853 = Predicted GPA	0.52
2. Non-Indiana University undergraduates (N=423)	
0.43978(UGPA) + 0.00333(LSAT) - 0.84106 = Predicted GPA	0.50
3. Indiana University School of Business undergraduates (N=239)	
0.56748(UGPA) + 0.00203(LSAT) - 0.48605 = Predicted GPA	0.49
4. Indiana University College of Arts and Sciences undergraduates (N=223)	
0.87269(UGPA) + 0.00135 (LSAT) - 1.10502 = Predicted GPA	0.54

TABLE 19. ANALYSIS OF VARIANCE OF UNDERGRADUATE GRADE POINT AVERAGE FOR INDIANA UNIVERSITY LAW SCHOOL STUDENTS CLASSIFIED BY ENTERING CLASS

Source of variation	Sum of squares	df	Mean square	F ratio
Between groups	4.0649	7	0.5807	2.9012**
Within groups	175.5427	877	0.2002	
Total	179.6076	884		

**p < .01 $\omega^2 = 0.015$

TABLE 20. ANALYSIS OF VARIANCE OF LAW SCHOOL ADMISSION TEST SCORES FOR INDIANA UNIVERSITY LAW SCHOOL STUDENTS CLASSIFIED BY ENTERING CLASS

Source of variation	Sum of squares	df	Mean square	F ratio
Between groups	170,042.0760	7	24291.7251	2.9520**
Within groups	7,216,771.4562	877	8228.9298	
Total	7,386,813.5322	884		

**p < .01 $\omega^2 = 0.015$

TABLE 21. ANALYSIS OF VARIANCE OF FIRST YEAR LAW SCHOOL GRADE POINT AVERAGE FOR INDIANA UNIVERSITY LAW SCHOOL STUDENTS CLASSIFIED BY ENTERING CLASS

Source of variation	Sum of squares	df	Mean square	F ratio
Between groups	6.3887	7	0.9127	2.1739*
Within groups	368.1980	877	0.4198	
Total	374.5866	884		

*.01<p<.05 ω^2 = .01

TABLE 22. ANALYSIS OF VARIANCE OF RESIDUAL SCORES FOR NON-INDIANA UNIVERSITY UNDERGRADUATES FROM INSTITUTIONS CLASSIFIED BY HIGHEST LEVEL OF TRAINING OFFERED

Source of variation	Sum of squares	df	Mean square	F ratio
Between groups	0.8436	2	0.4218	1.6722
Within groups	105.9350	420	0.2522	
Total	106.7786	422		

TABLE 23. ANALYSIS OF VARIANCE OF RESIDUAL SCORES FOR NON-INDIANA UNIVERSITY UNDERGRADUATES FROM INSTITUTIONS CLASSIFIED BY TYPE OF PROGRAM OFFERED

Source of variation	Sum of squares	df	Mean square	F ratio
Between groups	0.1137	1	0.1137	0.4498
Within groups	85.4359	338	0.2528	
Total	85.5495	339		

TABLE 24. ANALYSIS OF VARIANCE OF RESIDUAL SCORES FOR NON-INDIANA UNIVERSITY UNDERGRADUATE CLASSIFIED BY UNDERGRADUATE MAJOR

Source of variation	Sum of squares	df	Mean square	F ratio
Between groups	1.0404	2	0.5202	2.0628
Within groups	89.7787	356	0.2522	
Total	90.8191	358		

TABLE 25. ANALYSIS OF VARIANCE OF RESIDUAL SCORES FOR INDIANA UNIVERSITY UNDERGRADUATES CLASSIFIED BY COLLEGIATE UNIT

Source of variation	Sum of squares	df	Mean square	F ratio
Between groups	2.2121	1	2.2121	8.3023**
Within groups	122.5663	460	0.2664	
Total	124.7784	461		

**p < .01 $\omega^2 = 0.02$